"As Wordsworth so beautifully says,
'To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.'"
NEWBURYPORT, MASS.

Recent Fern Literature

Dr. W. N. Steil has published a careful and detailed study of apogamy in *Nephrodium hirtipes* Hook.[1] This species appears to depend entirely on asexual reproduction. In his cultures, Dr. Steil avoided conditions likely to induce apogamy; fertilization took place in the usual fashion on prothallia of other species grown in the same cases. But those of *N. hirtipes*, though they developed normally from the spores, produced no sexual organs in most instances and in any case only antheridia. The plant of the spore-bearing generation always arose as a direct outgrowth from the prothallium. In at least one other apogamous species, fusions between the vegetative cells of the prothallium have been observed to precede the growth of the young plant; but even this substitute for fertilization was lacking in *N. hirtipes*.

Dr. Steil gives a detailed account of the cell-changes which accompany the growth of spores in this species. They present some unusual features. In particular, the mother-cells from which the spores are eventually formed undergo a partial division; never fully completed, at an early stage of their growth and, probably because of this, sometimes produce six spores to the cell instead of the usual four—the latter a phenomenon never before observed in cryptogamous plants, though a similar one has been noted in certain phaenogams.

[1] Steil, W. N. Apogamy in Nephrodium hirtipes Hk. Annals of Bot. 33: 109–132. pls. 5–7. Jan., 1919.

Prof. E. W. Berry[2] has described as new, under the name *Matonidium americanum*, a species of fossil fern found in certain sandstone formations in Colorado. According to Prof. Berry's restoration, this fern bore, in life, numerous narrowly lanceolate pinnae, themselves pinnatifid, arranged fan-wise and spreading horizontally at the top of a stout stipe. This is the habit of its living relative, *Matonia pectinata*.

The genus *Matonidium* belongs to the family *Matoniaceae* which now consists of but one genus, with three species, all of which occur only in the uplands of the Malay Peninsula and the island of Borneo. They are survivors of a dying race which in earlier geologic times inhabited a vastly wider area. Representatives of one of the older fossil genera of the family, *Laccopteris*, have been found in both hemispheres, as far north as Greenland and Spitzbergen and as far south as Australia. Of *Matonidium* three species are known, one found in Europe, one in western North America and one in both regions. It may be noted that this distribution is strikingly like that of various living species or pairs of closely related species--such as, for instance, *Dryopteris Oreopteris*, *Athyrium alpestre* and *A. americanum*, *Polystichum aculeatum* and *P. Dudleyi*.

Mr. Maxon[3] has described two new species of tropical American ferns. One, *Alsophila scabriuscula*, is a tree-fern of Guatemala and the State of Vera Cruz, Mexico. The other, *Cheilanthes castanea*, is the

[2] Berry, E. W. A new Matonidium from Colorado with remarks on the distribution of the Matoniaceae. Bull. Torr. Bot. Club 46: 285-294, pls. 12, 13, figs. 1 and 2. Aug., 1919

[3] Maxon, W. R. A new Cheilanthes from Mexico. Proc. Biol. Soc. Washington 32: 111-112. May 20, 1919. A new Alsophila from Guatemala and Vera-Cruz. Proc. Biol. Soc. Washington 32: 125-126. June 27, 1919

fern of northeastern and central Mexico which has hitherto passed as *Cheilanthes gracillima* Eaton. From that species of the western United States it differs, Mr. Maxon finds, in its greater size, in having hairs instead of scales on the upper surface of the frond and in the characters of its scaly covering.

Prof. Vaughan MacCaughey[4] has published an ecological survey of Hawaiian pteridophytes. The most striking feature of the Hawaiian fern flora is the extraordinarily high proportion of species which are found nowhere except in these islands—123 out of 190.[5] This is due to the long isolation of the Hawaiian archipelago. The endemic species are very irregularly distributed among the different islands. Kauai has the most; Oahu is next; Hawaii, though much the largest in area, has the fewest. This, Prof. MacCaughey points out, furnishes striking corroboration of the generally accepted belief that the western islands are older and have been longer isolated than the eastern. It is just in the regions supposed to be geologically the oldest that the richest fern-flora is found.

Prof. MacCaughey divides the ferns into two series of groups, one based on their distribution in point of altitude, the other on their preference for wet, medium, or dry habitats. He closes with an annotated list of all the species known to occur on the islands.

SOME CURIOUSLY CUT SPECIMENS OF DRYOPTERIS BOOTTII—In August last while searching for Dryopteris hybrids in Washington, Mass., my son found a very

[4] MacCaughey, Vaughan. An ecological survey of the Hawaiian pteridophytes. Journal of Ecology 6: 199–219. Nov. 30, 1918.

[5] The type-setter, not Prof. MacCaughey, is doubtless responsible for the statement in the text that 195 out of 190 species are endemic—a remarkable percentage indeed!